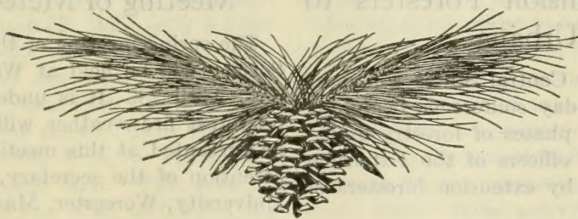


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FOREST WORKER



March, 1928

Published bimonthly by the **FOREST SERVICE**
UNITED STATES DEPARTMENT OF AGRICULTURE

CONTENTS

	Page
Announcements.....	ii
State forestry.....	1
Education and extension.....	4
Forest Service notes.....	8
General forest news.....	11
Foreign notes.....	17
Personals.....	19
Bibliography.....	21

Announcements

Central States Extension Foresters to Meet in Urbana

Extension foresters of the Central States will meet at Urbana, Ill., for a three-day conference beginning May 22. Talks on various phases of forestry extension work will be given by officers of the Extension Service in Washington and by extension foresters of seven States.

Science Meeting at Flagstaff

The eighth annual meeting of the southwestern division, American Association for the Advancement of Science, will be held in Flagstaff, Ariz., April 23-26, 1928. There will be sections on the biological, physical, social, and medical sciences and on education. In the general sessions and in the section on biological sciences it is planned to have a number of forestry papers. Officers of the committee arranging for the biological sciences program are Dr. J. J. Thornber, Tucson, chairman, and Dr. W. G. McGinnies, Tucson, secretary.

International Entomology Congress at Cornell

The Fourth International Congress of Entomology will be held at Cornell University, Ithaca, N. Y., during the week of August 12-18, 1928. Dr. L. O. Howard of the United States Bureau of Entomology will preside at the meetings. In the section of applied entomology two half-day sessions will be devoted to forest entomology. A number of European forest entomologists are expected to attend.

The former sessions of the congress were held at Brussels in 1909, at Oxford in 1912, and at Zurich in 1925.

Meeting of Meteorological Society

The spring meeting of the American Meteorological Society will be held at Washington, D. C., on Saturday, April 28. It is understood that several papers on forest fire weather will be presented. Papers to be presented at this meeting should be called to the attention of the secretary, Charles F. Brooks, Clark University, Worcester, Mass.

Forestry Fair at Waycross, Ga., in September

The second annual forestry fair in Waycross, Ga., will be held September 19-22, 1928. All timber owners of Georgia, South Carolina, Florida, Alabama, and other States in the pine belt are invited.

American Forestry Association Tour of Europe

A forestry tour of Europe has been arranged by the American Forestry Association for the summer of 1928. It is planned to sail from New York June 30 and to return September 8. The itinerary includes Sweden, Finland, Germany, Switzerland, and France. Arrangements can be made for extension trips to England, southern France, and Italy. The price, exclusive of extension trips, is \$1,065. The tour is open to both men and women and is not restricted to members of the association. A printed description of the tour can be obtained from the American Forestry Association, Lenox Building, Washington, D. C.



The annual meeting of the National Lumber Manufacturers' Association will be held at the Congress Hotel, Chicago, May 1 and 2.

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C.

MARCH, 1928

Vol. 4, No. 2

State Forestry

Forest Protection Progress in Louisiana

Of the 3,074,753 acres of pine forest land in Louisiana that was covered by the State's fire protection system in the year ending June 30, 1927, only 3.2 per cent was burned over. In the same year, it is estimated, fires covered 18.3 per cent of the 10,500,000 acres of similar land in the State that was not given organized protection. For the present fiscal year the protection area covers 4,000,000 acres, or about one-fourth of the State's pine forest land. This area includes portions of 22 parishes and of all sections of the State except the hardwood lands along the main rivers.

The forest protective work of the Louisiana division of forestry is supported through dues paid by owners of protected land, at the rate of 2 cents per acre per year; through an allotment of Federal funds; and through the State's severance tax on timber. Aside from their fixed contributions, cooperating landowners have erected 15 fire towers, at an average expense of \$1,000 for each tower.

During the past 18 months 700 miles of telephone lines have been erected by the State as part of the fire-protection system, and in 1927 more than 4,000 miles of firebreaks were constructed. These firebreaks are made by plowing two furrows about 50 feet apart and burning the grass or litter on the intervening space. The plowing is done with a "middle-buster." The firebreaks cost about \$3.50 a mile in longleaf country, and about \$1 or \$2 a mile more on mixed pine and hardwood land. The protection area is so broken up by these lines, together with roads and streams, that a fire can not ordinarily go beyond an area of 500 or 600 acres.

Reforestation Bills Introduced in New York Legislature

A measure introduced in the New York State Senate by Senator Charles J. Hewitt proposes the creation of a commission to investigate the State's reforestation problem. The commission's special object would be to find how much nonagricultural land suitable for reforestation there is in the State, where it is, and how it is valued, and to work out plans for promoting and financing the reforestation of such land. The commission would consist of two senators, two members of

the assembly, and three other persons, appointed by the governor. It would have all the powers of a legislative committee, and a fund of \$75,000 would be made available to cover its expenses.

A companion measure introduced by Senator Hewitt provides for a concurrent resolution of the senate and assembly looking to an amendment of the State constitution that would make possible a bond issue of \$100,000,000. It proposes that this amount be made available at the rate of \$5,000,000 annually for the next 20 years for the acquisition and reforestation of idle land. Under these activities would be included the establishment of forest nurseries.

A hearing on these bills was held in Albany, January 18, at which no opposition was developed.

Land Classification in Minnesota

A staff of 30 men has been put to work by the Minnesota Department of Conservation on the classification of State-owned land which was authorized by the legislature in 1927, and on which the department is to report in 1929. The object is to separate out from the lands suitable for agricultural use those that should be forested or reforested, and to collect information needed for successful handling of the latter. Areas will be classified as to their soil and topography and as to how much stone is present on them. Another factor to be considered is accessibility to roads, railroads, stores, and towns. Lands classified as agricultural will be divided into those immediately available for agricultural development and those that could be devoted to timber growing for a considerable period before being needed for agricultural use. For the forest land, data will be gathered on the amount of timber present, its age and condition, and any damage it has suffered from fire, insects, disease, or animals; the location of merchantable timber and conditions bearing on plans for cutting and removing it; and the character of reproduction. On the basis of this information a type map will be prepared for each section. In the coming summer data on age and growth will be collected.

The survey is expected to include also a study of the history of certain regions that have been settled and developed and then, when the timber was cut off, have been largely abandoned.

Three More States Cooperate in Fire Protection

Agreements recently signed by the State foresters of Illinois, Delaware, and Florida provide for cooperation with the Federal Government under section 2 of the Clarke-McNary law in protecting the forest lands of those States from fire.

West Virginia Improves its Fire Score

Hunters caused 36.3 per cent of the forest fires that occurred on protected land in West Virginia in 1927, the State conservation department reports. Fires on the protected area of more than 5,000,000 acres during the spring and fall fire seasons numbered 383. The average area burned over was 29 acres, as compared with 53 acres in 1926.

Every sawmill and every logging locomotive in the State were inspected during the year, and fires from these causes were materially reduced. Brush burning has lost its sinister leadership as a cause of forest fire since the department entered into a cooperative arrangement with farmers under which rangers supervise all brush-burning activities.

During 1927 the West Virginia fire protective organization was strengthened by the employment in the Pocahontas district of a full-time district ranger with technical training in forestry. Two steel fire towers were erected on new sites, and a third replaced an old tower; and 77 miles of telephone lines were constructed, bringing the commission's telephone mileage to more than 400.

Wisconsin had an unusually light forest fire season in 1927, with only 229 fires on about 8,000,000 acres of protected land. The areas burned averaged 53 acres per fire.

Each district ranger of Wisconsin has now been provided with a truck for carrying tools, water, and power pump, and emergency wardens throughout the forest protection districts have been supplied with boxes of tools.

The forest fire suppression work of the Michigan Department of Conservation was unusually successful in 1927, despite rather severe fire conditions. The average fire burned over less than 40 acres. One reason for the improved showing was that a new staff of assistants and inspectors was added to the State forestry organization and that an assistant district warden was appointed in each district exclusively for fire protection work. More than 100 fire towers were in operation in the State throughout the fire season.

New Protected District in New York

A new forest fire district adding more than 2,000,000 acres to the 14,000,000 already covered by the forest fire protective work of New York State has been established in Otsego, Chenango, Broome, and western Delaware Counties. Together with considerable areas of highly developed agricultural land, this district includes vast tracts of forest land. Its need for better forest protection is intensified by the presence of a considerable body of second-growth forests and woodlands and by the fact that its reforested area is rapidly increasing.

Changes in Clarke-McNary Inspection Districts

Changes in the districts assigned to inspectors of forestry work done by States, in cooperation with the Federal Government, under sections 1-4 of the Clarke-McNary Act divide as follows the territory lying south of the Lake States and east of the western boundaries of Iowa, Missouri, Oklahoma, and Texas:

Gulf States district: The substitution of Arkansas for Missouri makes this district include the States of Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. District forest inspector, C. F. Evans. Headquarters: Customhouse, New Orleans.

Central States district: This new district includes Ohio, Indiana, Illinois, Iowa, Missouri, Kentucky, and Tennessee. District forest inspector, E. Murray Bruner. Headquarters: Louisville, Ky. (probably in the Federal Building).

Northeastern district: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York. District forest inspector, C. R. Tillotson. Headquarters: French Hall, Amherst, Mass.

Middle Atlantic district: Pennsylvania, New Jersey, Delaware, and Maryland. District forest inspector, G. T. Backus. Headquarters: Atlantic Building, Washington, D. C.

Southeastern district: Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. District forest inspector, S. H. Marsh. Headquarters: Harrisonburg, Va.

Forest fires in Maryland in 1927 were held to an average of 19 acres, the lowest average recorded for this State in any year. The previous low record was 62 acres, recorded in 1919. The total acreage, also the lowest of record, was 4,202. The number of fires reported, 227, was lower than in any year since 1921.

In 1927 the mildest forest fire season Minnesota has experienced for many years gave the State a record of 507 fires burning an average of 58.6 acres each. In the preceding 12 years the average area burned per fire in Minnesota was about 350 acres.

Some Planting Experiments in Texas

Eighteen thousand seedlings were raised in the nursery of the Kirbyville State Forest, Texas, for planting on cut-over land within the forest during the past winter. Because of the scarcity of pine seed in the South in 1926, longleaf was the only native pine grown. In the hope of finding valuable fast-growing species not native to Texas that can be grown successfully there, the State forest officers raised stock for a 1-acre plot of each of the following species: Monterey pine, maritime pine, western yellow pine, Japanese red pine, Japanese black pine, Italian cypress, cedar of Lebanon, and deodar cedar. Other exotics that were raised in the nursery but did not grow large enough for field planting were Austrian pine, Himalayan pine, redwood, and Douglas fir.

This planting was made an opportunity for trying out different methods and different tools, to find which will do the work most economically and most efficiently. Records of the cost of the operation, covering seed collection and extraction, nursery work, and planting, will be made available to farmers, lumber companies, and other tree planters of the State.

Studies are being made on the Kirbyville Forest of the possibility of reforestation by means other than planting. In 1925, when there was a fair crop of seed of longleaf pine, trees were examined for production of cones and seed, and in 1926 a careful examination was made for seedlings. Practically no seedlings were found, evidently because such quantities of seed were eaten by birds and rodents. Seed production of 100 selected trees is now being recorded each year. In the spring of 1926, longleaf seed were sown broadcast over 35 acres of open land on the forest. Practically no seedlings resulted from this sowing, again probably because the seed had been eaten by birds and rodents. This experiment was repeated in the fall of 1927 to find whether the fall is a more favorable season for direct seeding than the spring.

County Demonstration Forest on Cut-Over Land

A demonstration forest is to be developed by Santa Cruz County, Calif., on cut-over redwood land near the point where the State highway into Big Basin joins the San Lorenzo Canyon road. An area of between 15 and 20 acres has been leased to the county supervisors by the Santa Cruz Lumber Co. for 50 years at a cost of \$1 a year. The farm bureau forestry committee of the county, headed by S. B. Hunt, of Scotts Valley, is in charge of the work. Six thousand trees, mostly redwood and Douglas fir, are being supplied by the State forest nursery and the Eddy Tree Breeding station.

The name of the Connecticut Forestry Association has been changed to Connecticut Forest and Park Association.

A State Forest Presented to Vermont

Nine hundred acres of land in Granville Gulf, Vt., has been presented to the State by ex-Gov. Redfield Proctor as a State forest. The land lines both sides of the Gulf Highway for nearly 6 miles. Nearly the whole tract is well-timbered with spruce and hardwoods. The deed prohibits the cutting of timber within sight of the highway, except occasional trees that might endanger travel. It bans commercial establishments or advertising signs, but would permit the establishment of a public camp out of sight of the main road. The forest will be known as the Granville Reservation.

This gift brings the total number of Vermont's State forests to 17 and their area to 32,435 acres.

Education the Keynote of Mississippi's First Two Forestry Years

The report of the Mississippi State Forestry Commission for the biennium ending June 30, 1927, the first years of forestry work by the State, is a record of strenuous activity in public education. The commission decided at the outset that the entire fund of \$10,000 per annum provided for its work should be devoted in the first two years to an educational campaign. To this end, a State supervisor of forestry education was employed, the first district forester appointed was detailed to intensive work with the superintendent of education and county agent of Simpson County, and the educational work of the State forester's office was closely coordinated with the farm forestry program of the State extension forester.

Simpson County was the center of most intensive effort. Every community in the county and every white school were reached. Fourteen local fire-protective associations were formed. Encouraging results were obtained in the matter of fire prevention. During the year ending July, 1927, less than 1,000 acres were burned over in the county. Similar work has been started in other counties. "The plan is to intensify the work in the counties where it is already started and expand gradually to neighboring counties, instead of trying to arouse interest in isolated points over the State." All the schools of the State, however, were given assistance in introducing forestry into the curriculum and a text was prepared and distributed for the use of teachers in correlating forestry with geography, nature study, science, biology, botany, history, civics, agriculture, and English. The forestry law of Mississippi specifically directs that State and county boards of education provide for proper courses of instruction by textbooks or lectures on forestry.

The American Legion's purchases of land for a Connecticut State forest, in the town of Barkhamsted, have grown to 320 acres. The 100 posts of the Legion in Connecticut are still collecting for this purpose, with the aim of making their gift an even 500 acres.

North Carolina Authorizes New Game Preserves and a Game Farm

A game farm from which North Carolina forests may be stocked with quail, pheasants, and wild turkeys is to be established in Randolph County, N. C., on a tract of land now included in the county farm, about 2 miles south of Ashboro.

Besides adopting this plan, the State board of conservation and development at its January meeting authorized the establishment of two new game preserves. One of these will cover between 8,000 and 10,000 acres of land on the Nantahala National Forest, Marion County. The chosen area lies along the watershed of Wayah Creek, about 8 miles west of Franklin, commencing at Arrowwood Branch. Some private holdings included in it will become part of the refuge, through agreement of the owners. The land designated for the refuge is almost entirely surrounded by national forest land on which hunting will be permitted. It now has a game population estimated at about 21 deer and three flocks of wild turkeys, and the board of conservation and development has appropriated \$500 for adding to this stock of game.

The other new refuge will be the State's first quail preserve. It is to be located in Guilford County on land surrounding the municipal reservoir of Greensboro. Use of this land is being given by the city and by a number of private landowners under 10-year leases. Here it is planned to maintain 1,465 acres as a refuge and to have a much larger surrounding area available for public shooting grounds.

The second annual crop of forest planting stock from the State Forest Nursery of Alabama, that of 1927, was shared by 237 landowners, and was several times too small to fill all the requests received. The species most in demand were catalpa, black walnut, and black locust. The trees were distributed in lots of from 12 to 500. In the present experimental stage of forest planting in Alabama the State forestry organization does not advise heavy investments in planting.



Forest planting in California made more progress in 1927 than in any preceding year, State Forester Pratt reports, and brought the total of forest plantations in the State to 53,377 acres. Timber companies of the State reforested 7,616 acres during the year, mostly with redwoods. Los Angeles County, by planting 173 acres, brought its total reforestation area to 1,873 acres, planted mostly to Coulter pine. In addition to the trees that were planted on State land, the State forestry organization provided 12,450 for use by farmers in developing wood lots and windbreaks.



The Pixley farm of about 216 acres in the Rome-Boonville Gorge, near Boonville, N. Y., is to be purchased by the State conservation department for development as a public camp site. The farm includes the Pixley Falls, and more than half of it is covered with forest growth. It is crossed by the Lansingkill stream, the Black River Canal, and the Rome-Boonville State highway. This site is farther west than any of the camp sites yet established in the Adirondack area.

Education and Extension

Forest School Conference at Berkeley

The forest school conference held in Berkeley, Calif., December 15, preceding the meeting in San Francisco of the Society of American Foresters, had an attendance of about 175. Delegates were sent by 14 schools. The men who joined in the conference included alumni of all existing forest schools in the United States and of three European forest schools. The discussions which occupied morning, afternoon, and evening sessions revealed a cross section of opinion as to the improvement of curricula and of the training of students to fit into present-day forestry conditions.

The district foresters of the Federal Forest Service who employ the greatest numbers of forestry graduates gave their views as to the qualifications needed for the immediate task in Forest Service work. A. S. Peck, district forester of the Rocky Mountain National Forest district, said that 16 $\frac{2}{3}$ per cent of the technically trained men placed in ranger positions in his

district had failed to make good, as against 8 $\frac{1}{2}$ per cent of the untrained men. On the other hand, 45 per cent of the trained men are now considered for advancement, as against 28 per cent of the untrained. The district foresters emphasized the fact that the man who suits them best is not necessarily the man with the best technical training, but the man in whom a good fundamental training in forestry is united with adaptability, a good cultural background, and a certain amount of administrative ability.

E. D. Merrill, dean of the Agricultural College of the University of California, who is a member of the committee on forest research of the National Academy of Sciences, informally discussed the committee's preliminary report; and Dean H. S. Graves, of the Yale Forest School, reported on a survey of forestry education in the United States which he has made in connection with the work of this committee. Dean Graves expressed the opinion that the American forest school system is ill balanced in that too many of the schools

are trying to do practically the same thing. He called attention to the fact that the United States has nothing corresponding to the so-called intermediate forest schools of Europe, unless in the single instance of the North Dakota School of Forestry; whereas most of the forestry positions in this country, particularly those in connection with the management of privately owned timberlands, are of an "intermediate" character. M. A. Benedict, supervisor of the Sierra National Forest, expressed his belief that the usual four-year undergraduate forestry course hits between the two types of training that are most needed—a good vocational training for men to do routine work on the ground, and a thorough training in research. Most of those who spoke on this subject dwelt on the difficulties in the way of putting a curriculum of intermediate grade into effect in any of the existing forest schools. Several pointed out that most of the students coming to the forest schools are too ambitious to choose a course of vocational rather than professional grade.

At Dean Graves's suggestion the conference expressed approval of the continuance by the National Academy of Sciences of studies in the field of forestry education and plans for fellowships in forest research.

Forest Research Fellowships Recommended

By WARD SHEPARD, United States Forest Service

The forestry committee of the National Academy of Sciences last autumn requested the Society of American Foresters to prepare a detailed plan for the creation of research fellowships in forestry, with the expectation, if the plan seemed satisfactory, of considering ways and means of putting it into effect. A report indorsed in December by the society meeting and the conference of forest schools held in California was submitted to the National Academy committee in January.

The report recommends the creation of from 15 to 20 fellowships, for the training of research specialists in silviculture, forest products utilization, and forest economics, and in a few cases for the most advanced training of picked men in the underlying sciences, especially plant physiology. The report recognizes the need for training men for research in practical methods of silviculture and utilization, and strongly stresses the need of advanced economic research, especially in the financial problems involved in reorganizing the lumber industry on a basis of perpetual operation.

The report clearly brings out the key position which research occupies in the forestry movement, and the necessity of fostering in research the best scientific traditions and practices. It also brings out the larger human implications of forestry, asserting that in no other way can man so profoundly modify the earth and its productivity as in substituting silviculture for forest destruction.

School Forest Given to Texas College

A school forest of 640 acres is being given to the Texas Agricultural and Mechanical College by John H. Kirby, president of the Kirby Lumber Co., Houston. The choice of a suitable tract from among Mr. Kirby's large holdings in eastern Texas has been entrusted to State Forester Siecke and the Kirby Lumber Co.'s land commissioner. In addition to serving as a forestry laboratory, Mr. Kirby foresees, the forest will provide the school with a considerable annual income. This, he stipulates, is to be used to create a student loan fund, preferably for students taking forestry courses, administered by the association of former students of the college.

Planning Windbreaks for Iowa Farms

"Shelterbelt schools" are being held in Iowa this season by Extension Forester Bode, to meet the increasing call of farmers for help in making plans for protection plantings. Each school is an all-day meeting. The morning is given to discussion of general phases of tree planting, and in the afternoon each farmer plots out his own farmstead and receives help in planning his windbreak. In February four meetings were held in each of three counties, and resulted in plans for plantings on 75 farms. The attendance, which included school children, totaled 272 and represented 34 townships.

All over Iowa, Mr. Bode says, windbreaks planted years ago are rapidly breaking down. Usually he recommends gradual replacement by planting one or two rows at a time. In order that the young trees may have enough sunlight and moisture it is advised that they be placed at least 20 feet from the old ones.

Mr. Bode has much to tell the farmers about the suitability of different trees for windbreak purposes. For most parts of Iowa, he says, the best choice is a combination of white pine and Norway spruce. Even without the help of the higher-crowned white pine the spruce can make a good windbreak, and for low ground or ground without good subdrainage it is the first choice. Still wetter ground calls for white spruce and white cedar (*Arborvitæ*), and where drainage is very poor it is best to use willow. Other trees recommended are Black Hills spruce, Austrian pine, western yellow pine, and (for the eastern and southern parts of the State) Douglas fir. For quick but temporary results Scotch pine may be used, and, on very sandy or gravelly soils, Jack pine. Broad-leaved trees that make good windbreaks if planted in large blocks are ash and poplar.

An offer of \$10 for the best original forestry slogan submitted is one of the devices of the Mississippi Forest Service for arousing interest in American Forest Week.

Camp Fire Girls Celebrate Tree Year by Planting

Two hundred thousand trees last year played the "lead" rôles in the Tree Year celebrations of Camp Fire Girls. In scores of communities scattered through at least 27 States the girls set out trees by ones, twos, hundreds, and thousands to make up this total. And planting the trees was not all of the job; for the girls raised the cash they needed for the work by devices such as candy sales, paper sales, banquets, plays, and movie shows.

In some cases trees were planted as memorials or for use as living Christmas trees. The girls of Tucson, Ariz., for instance, bought an evergreen for \$10 and planted it in the city park to serve as a municipal Christmas tree. These girls realized that the planting was only the beginning, for they wrote to the New York headquarters of the organization "You may not know that this is a desert country and to plant and care for a tree is a big undertaking on account of the five months of intense heat and dryness."

Many plantings were for the beautification of school yards, parks, and other public grounds, and of roadways. Fifty trees were planted in a Sacramento schoolyard, 47 in a school forest at Hamilton, Mont., 100 on a school lawn of Selah, Wash. Staten Island girls made a Camp Fire plantation of 2,000 young spruce in a local public park. Ithaca, N. Y., girls planted 3,000 trees on the city watershed, under the direction of the forestry department of Cornell University and of the city forester.

Many groups planted their trees on their own camp grounds, or as Camp Fire groves. Girls of Latrobe, Pa., made a camp-ground plantation of 1,000 trees, under the direction of District Forester V. M. Bearer. Winnetka, Ill., girls, with some help from grown-ups who dug holes for the trees, made one day's work of planting 4,000 white pine and spruce furnished by the State department of agriculture. The especially ambitious program adopted by the Greater Boston Camp Fire Girls called for the planting of seven forests, each of 3,500 pine seedlings, dedicated to the seven points of Camp Fire Girls' Law.

Civic spirit was expressed in many of the Tree Year projects. Denison, Tex., girls, besides undertaking the care of the town's park and boulevards for the summer, held a sale of trees and shrubbery. Fort Worth girls took a tree census of City Park. Those of Sequin, Tex., made a tree survey to be used by the local chamber of commerce. St. Petersburg, Fla., girls decided on a campaign against wilful burning on city lots. In Palmerton, Pa., the tree commission of the borough council helped the girls draw up a plan for city planting, designating a special tree for each avenue, and made a tree map showing what property-holders had not planted trees. The girls undertook to interview each of these property-holders, and to provide them with nursery trees at wholesale prices.

That the girls did not mean to drop their active interest in trees at the end of Tree Year was shown by many acknowledgments of responsibility for future care of trees planted and by the many progressive projects undertaken. Ten Middletown, N. Y., girls started tree nurseries, each girl planting in her home garden 100 trees to be distributed a year or two later among farmers for planting in waste corners. Girls of Tuxedo Park, N. Y., started a tree nursery with 200 cedars. In Columbia, Mo., Camp Fire Girls planted a potful apiece of Norway spruce seed given by the State forester, planning to transplant the seedlings when they were a year old. Coffee Creek, Mont., girls secured a deed to two lots and undertook to improve the land as a town park. Girls of Waynesville, Ohio, got the board of education to turn over to their care an undeveloped 2-acre plot of school property which they proposed to convert into a park, and those of Pacific Grove, Calif., persuaded the city government to give them 1½ acres of land in the center of town for development as a park.

Some groups made the tree-planting a ceremonial, using a plan of exercises suggested by their central organization; others made it a picnic. Numbers of plantings took the form of Arbor Day celebrations. Girls of Humboldt County, Calif., celebrated Lincoln's Birthday by traveling out to a cut-over area near the Carson Woods and planting there some 1,000 redwood trees. Syracuse, Sandy Creek, and Phoenix, N. Y., girls camped over the week-end at the scene of their forestry labors, starting for camp after school on Friday and devoting Saturday to the planting of 1,500 trees under the direction of Frank W. J. McGibbon. Girls of Dallas, Tex., after meeting at 6.30 a. m. at R. C. Gilliam's bird sanctuary and cooking breakfast for themselves, carried out their planting in a heavy down-pour of rain. Hastings, Mich., girls hiked 4 miles and cooked a camp breakfast as preparation for planting in one day most of their quota of 2,000 trees.

New York Four-H Clubs Plant Half a Million Trees

Four-H boys and girls of New York State jumped at the chance given them in 1927 by the State conservation department to start forest plantations with free stock. The department's offer to give 1,000 young trees to any Four-H club member enrolled for forestry work was taken up by 500 boys and 48 girls. Twenty counties, instead of 10 as in 1926, took part in the year's forestry club work, and the number of trees planted by club members in the preceding year was multiplied by five.

The plantings were managed with care. Each of the young planters received an illustrated booklet of planting directions specially prepared for Four-H club members, and county club leaders delivered each bundle of trees and personally supervised each planting.

Members of the Unadilla club bought and surveyed 16 acres of land for their planting.

Michigan Wants Forestry Material for Library

The School of Forestry and Conservation of the University of Michigan is to maintain its own library, separate from the main university library. The school will make a special effort to collect in its library historical documents, papers, books, and pictures pertaining to the lumber industry in Michigan. A general appeal is made to all those who may have such material to entrust it to the school.

The new library will be under the direction of Miss Ellen Hoffman, who has had charge of the library and research files of the Forest Products Laboratory, Madison, Wis.

Arboretum and Demonstration Planting at Lehigh

Lehigh University, Lehigh, Pa., gives no courses in forestry, but it has an 18-year-old arboretum containing many varieties of forest trees and a demonstration forest most of which was planted 12 years ago.

In 1907, at just about the time when Dr. Henry Sturgis Drinker became president of Lehigh, the many chestnuts that graced the university campus began to succumb to the blight. The effort to save these trees, and later the problem of replacing them, greatly intensified Doctor Drinker's interest in forestry. Two years later, largely owing to this interest on his part, a 6-acre arboretum was established as an adjunct to the university's work in botany. The work was planned by Dr. Robert W. Hall, head of the university's department of biology. Five seedlings each of about 200 North American tree varieties were planted in the three-year period 1909-1911. Trees of every variety planted have survived, and the arboretum now contains about 800 trees, many of which are from 30 to 40 feet high.

In 1915 the university began the planting of its demonstration forest, with the aid and advice of Dr. Joseph T. Rothrock and Hon. S. B. Elliott. A 6-acre tract of hilly land having very poor soil, and unfavorably exposed, was chosen for the planting, in order to give students in the Pennsylvania forest schools an opportunity to study the growth of important native forest species planted on sites of this type. The area was divided into 23 plots, on which were planted 1 and 2 year old seedlings of 13 broad-leaved and 9 coniferous timber species. In 1919 the deciduous trees were severely injured by an attack of the 17-year locust. Most of the trees that died back to the surface of the ground as a result of this attack sent up strong shoots the following year, but some plots had to be replanted. At present, 12 years after the first plantings and five or, in some cases, six years after the replantings, the forest presents a very promising appearance, some of the pines and larches having reached heights of 20 feet or more.

A tree nursery dating from the time when the arboretum was begun is maintained in one corner of the arboretum plot to provide planting stock for the university's needs. All told, the trees that have been planted on the university's property number 111,680.

Practical Work by Four-H Clubs in East Texas

Thirty boys and six girls in the Four-H clubs of east Texas worked on forestry projects during the year 1927 under the direction of Extension Forester C. B. Webster. The children studied forestry lessons, gathered forest tree seed, collected and mounted forest tree specimens, and in many cases undertook to improve an acre of young pine forest. Charles Jameson, of Tatum, Rusk County, took charge of an acre of sweetgum thicket which he surrounded with a fire line, cleared of the worst of its brush, and thinned. With his labor charged at the rate of 30 cents an hour, the sale of fence posts and cordwood from the area brought in a net profit of \$5. Charles A. Rowell, jr., a 12-year-old of Marion County, with the help of a younger brother worked an acre of young pine mostly just short of tie size. The labor in this case, at the 30-cent rate, represented an expense of \$12.80, while the thinnings, worked up into fence posts, tomato stakes, and cordwood, had a value at local rates of \$16.51. Madeline Lee, of New Hope, Rusk County, collected and mounted specimens from 84 different kinds of trees growing in the county, including in most of her mountings the leaf, fruit, and cross and tangential sections of the wood.

Through Four-H forestry club work Mr. Webster is endeavoring to teach the rising generation the wastefulness of certain practices in the treatment of forest land that are still current in east Texas. In parts of this region trees are still being poisoned and girdled to clear large areas of land for cultivation, while at the same time a large acreage of wornout land is lying idle. Fires, also, destroy much promising young growth as well as injure or destroy mature timber.



Children in the public schools of Marion County, Fla., are to study reforestation and fire prevention for a period of 30 days, according to a resolution adopted in February by the county board of instruction. The study will be related to local conditions. It is to be introduced in as many classes and as soon as is practical. Approval of this plan has been expressed by the Marion County Chamber of Commerce.



Arkansas women's clubs have begun to plant trees and shrubbery along the 56-mile concrete highway between Little Rock and Hot Springs. On the stretch of about 20 miles from Little Rock to Benton, local clubs have undertaken to plant 1 mile each.

Forest Service Notes

Effect of Pruning Douglas Fir Planting Stock

By JULIUS F. KÜMMEL, United States Forest Service

Douglas fir trees planted on the Snoqualmie National Forest in 1915 appear to have established themselves with greater success as a result of being "top pruned." The trees, transplanted at the end of the first growing season, were allowed to remain in the nursery for two years instead of the usual one year before being set out in the field. Consequently, when they were lifted from the nursery rows they had tops ranging from 12 to 26 inches in height and averaging 17 inches. Since 7 or 8 inches of root was as much as could conveniently be handled, the trees showed a very poor proportion between tops and roots. To overcome this, two lots of 50 trees each were pruned. In one lot the leaders were cut off; in the other, portions of the side branches only were removed. These lots of "leader-pruned" and "branch-pruned" trees, and a third lot of 50 trees that were left unpruned, were planted on adjoining plots on a gently sloping south exposure at an elevation of about 2,200 feet.

Comparison of the condition and growth of trees in the different lots, eliminating the influence of extraneous factors, was made on the basis of data for the first three years, the period that should bring to light any influence of top pruning on the survival of planted trees. Grade of thriftiness of living trees was arrived at by giving a relative weight of 3 to each tree classed as good, 2 to each classed as fair, and 1 to each classed as poor. Mortality per cent, degree of thrift, and growth in the three years were as follows:

Treatment	First fall			Second fall			Third fall		
	Mortality	Grade	Current height growth	Mortality	Grade	Current height growth	Mortality	Grade	Total height
	P. ct.	In.		P. ct.	In.		P. ct.		Ft.
Not pruned.....	0	93	3.3	0	72	6.5	4	83	2.4
Leader pruned.....	0	99	4.3	2	82	9.9	2	89	2.5
Branch pruned.....	0	98	3.8	2	90	11.4	4	91	2.9

The difference in mortality among the three plots was too slight to carry any significance. In thrift the pruned stock scored higher than the unpruned stock

each year, no marked difference appearing between the leader-pruned and branch-pruned lots. In current height growth the branch-pruned stock led the unpruned both in the first and in the second year. The leader-pruned trees can not fairly be compared with the others in growth during these years; at this time their upper branches were still contending for leadership, whereas in the other groups height growth was concentrated usually in a single leader. In the third year, when total height instead of current height growth was tallied, the branch-pruned stock still led, but the leader-pruned stock had overcome its former disadvantage as compared with the unpruned stock.

The data consistently indicate that pruning of the tops assisted trees in establishing themselves, although not to the extent of causing a materially greater survival. These results do not preclude the possibility that in the case of trees subjected to more unfavorable conditions, such as adversity of site or of weather conditions in the first season, the greater thrift resulting from pruning might definitely affect survival.

One objection to pruning coniferous stock has been the possibility of producing permanently forked trees. Forked trees are sometimes produced in plantations made with unpruned stock and even in stands of natural reproduction, when the terminal buds or leaders are accidentally injured. The occurrence of forked trees in these plots is shown by the following table:

Percentage of trees without single leader at various examinations

	1st fall	2d fall	3d fall	12th year
Not pruned.....	-----	46	32	2
Leader pruned.....	-----	60	32	10
Branch pruned.....	12	18	26	0

Of the five trees in the leader-pruned lot that had forked boles in the twelfth year after planting 2 were forked at heights greater than those to which they had grown when they were planted, which showed that the forking was not due to pruning. One other was close to regaining its normal shape through suppression of one branch. This leaves 2 trees, or 4 per cent, of the leader-pruned stock that apparently will be permanently forked as a result of pruning, in comparison with none in the branch-pruned stock. The one forked tree of the unpruned lot must of course have been injured.

Just why this difference should appear in the twelfth year, when forking was almost equally prevalent among the different lots in the third year, is not clear. Perhaps the explanation is that the artificial pruning was more severe than that due to accident. Some evidence in support of this hypothesis was noted in the appearance of the boles of several of the leader-pruned trees. Not only were 5 of these trees still forked in the twelfth year, but 4 others had dead stubs protruding from the bole at an acute angle and 2 others had a swelling on the bole at planting height, probably marking the point from which contending leaders had branched. Nothing of this sort was noticed in the branch-pruned or unpruned lots.

Examination in the first year after planting showed that the rapidity with which a leader-pruned tree regained its normal form was considerably influenced by the position of the cut severing the leader. When the cut was made directly above a large lateral bud or a single vigorous lateral twig, a single leader formed quickly; but when it was made above a whorl of branches of fairly equal size, each of these branches endeavored to become the leader, and the restoration of the single-leader form was consequently delayed.

Although the tendency of leader pruning to produce a small increase in the number of permanently forked trees may probably be lessened by care in locating the cut, branch pruning, which does not increase the number of forked trees and is equally effective with leader pruning in facilitating establishment, is believed to be the better method.

A New Nursery for the Monongahela National Forest

By R. M. EVANS, United States Forest Service

Anyone visiting the Monongahela National Forest this spring must be prepared to talk planting, for the interest of everyone on that forest is centered on the new tree nursery at Parsons, W. Va.

The planting job on the Monongahela is a big one. Thirty or forty thousand acres of the forest suffered greatly from fire while in private ownership. The first fires following the spruce cutting of early years destroyed the slash and reproduction. Subsequent fires continued the destruction until the once rich forest growth was replaced by blackberry vines. More fires, and even the vines gave way to the totally worthless bracken. These lands now bear almost no timber.

In 1919 the Forest Service established a tiny nursery at Gladwin, W. Va., to determine whether the site was adaptable for nursery purposes and whether planting was feasible on these deforested lands. In 1922 the first young trees were ready for planting, and 16 acres on Shavers Mountain was reforested to spruce. The Gladwin site proved to be well adapted for a forest nursery, and the capacity has gradually been increased

to about 150,000 trees. This is too little to make much impression on the barren hillsides so much in evidence; but now, fortunately, increased appropriations for planting work have made possible a nursery program more in keeping with the Monongahela's needs.

Gladwin, ideal as to soil, lacks transportation facilities for the rapid and cheap distribution of large quantities of planting stock. So the National Forest Reservation Commission at its February, 1928, meeting approved the purchase of 28 acres just in the edge of the town of Parsons, and this tract is now being developed into an up-to-date nursery. Sufficient seed will be sown this spring to produce 1,000,000 trees, chiefly red and Norway spruce. About 100,000 white pine will be provided for, to plant old fields on the Shenandoah and Natural Bridge Forests. A little red pine, hemlock, white spruce, European larch, and southern balsam fir will be included for experimental purposes.

The expanded planting program for the national forests of the East, in which the Parsons nursery is the latest development, made good progress in 1927 with the establishment of nurseries on three forests. On the Lee National Forest, near Petersburg, Va., a nursery was started that after 1928 is to have a capacity of 500,000. Here loblolly and shortleaf will be grown to reforest the 3,000 acres or more of old farms and areas cleared for cantonment purposes. A nursery of similar size and purpose was started on the Jackson National Forest, near Columbia, S. C., for the purpose of raising longleaf and loblolly pine. The Ocala National Forest, on the Florida Peninsula, got an experimental longleaf pine nursery.

In the fiscal year 1929, or as soon thereafter as finances permit, the Forest Service plans to establish a nursery on the Pisgah National Forest, in North Carolina, to supply planting stock for the southern Appalachian group of forests, and one on the Ozark National Forest, in Arkansas, where many acres of old fields make no promise of restocking naturally within a reasonable number of years.

Central States Experiment Station Headquarters

Headquarters of the Central States Forest Experiment Station have been established in the Horticulture and Forestry Building, Ohio State University, Columbus, Ohio. The station is reached by taking a Neil Avenue car, and its telephone number is University 3148, Station 372.



More than 24,000 hewn ties were cut in 1927 on the Walhalla-Westminster Working Circle of 50,000 acres on the Nantahala National Forest, North Carolina, from white and mixed oaks unmerchantable as saw timber and classed as "salvage."

Government Recovers Damages for Burned Young Growth

Damages of \$12,674.14 for destruction of young forest growth by fire have been awarded to the Government in its case against the Feather River Lumber Co., tried before the United States District Court for the Northern District of California. The fire occurred on the Plumas National Forest, Calif., in August, 1924. Objection of the defendant company to the inclusion in the damages, which total \$41,575.80, of the item for young growth was answered by the court as follows: "The Government is entitled to recover for the damage arising out of the destruction of young growth. The difference in the market value of the land before and after the fire is not available as a measure, since the national forest is not marketable. Reforestation cost is the proper basis for computing the loss."

The Government's right to recover the amount needed for reforestation of national forest areas on which young timber has been destroyed by fire has previously been recognized by the courts in one or two fire trespass cases. In the previous cases, however, the claim was never for so substantial an amount, and the decisions were not published.

Conservative Chipping Reduces Tree Mortality

In second-growth pine stands worked for naval stores by some of the more improved methods of chipping the annual mortality from turpentine averages less than one-half of 1 per cent. For second-growth pines used in the Starke, Fla., tests of the Southern Forest Experiment Station, losses by death were as follows:

Loss in second-growth longleaf and slash pine due to turpentine and other causes

Tract	Species	Number of trees in group	Duration of study	Average annual loss caused by		
				Turpentine	Insects	Lightning
Sampson Lake	Slash	600	4	Per cent 0.20	Per cent 0.92	Per cent 0.05
Powell	Longleaf	350	4	.42	.07	-----
Johns	do	212	1 1	.50	.50	.50
Do	Slash	50	1 1	-----	-----	-----

¹ Second year of working.

Experiments conducted at Starke have shown the slight injury caused to the tree by conservative working in contrast with the injury caused by severe methods that actually produce less resin over a period of years. From 1923 to 1926, inclusive, 600 slash pine trees on the Sampson Lake tract were worked with but one face to a tree, the width of the face being about 33 per cent of the tree's total circumference. At the

same time 50 trees adjacent to and intermingled with this group were worked with two faces to a tree, the faces having a combined width of 75 per cent of the tree's circumference. In the first group the streaks varied from one-fourth to 1 inch in depth and from one-fourth to three-fourths of an inch in width; in the latter the streaks were one-half inch wide and one-half inch deep. Gutters in both groups were raised the first three years of operation, and secured by inserting them in broad-ax cuts. During the four years of the experiment the conservatively worked group sustained only one-fortieth as much loss by death due to turpentine as the group severely worked. The percentages lost through different causes are shown in the following table:

Losses in second-growth slash pine severely and conservatively worked over a period of four years (1923-1926, inclusive)

Cause of death	Average annual loss	
	Severe working (50 trees)	Conservative working (600 trees)
	Per cent	Per cent
Turpentine	8.00	0.20
Insects	1.00	.92
Lightning	-----	.05

Complete Victory Over Logging Equipment Fires

Forest fire due to the operation of logging equipment has for two years been an unknown occurrence so far as the national forests of Arizona and New Mexico are concerned. To bring about this state of affairs forest officers of the Southwestern National Forest District have spent many years' effort in building up strict observance of a code of preventive measures for the fire season. This code in the first place requires the use of fire-preventive devices on logging machinery and the use of oil as fuel under all steam boilers. It forbids the moving of a locomotive while coals remain in the fire box, when wood has been used to warm up the engine. It requires that rights of way be cleaned up; that fire-fighting tools be kept available for the use of logging crews; that pumps and hose be carried on all steam machinery and used to wet down around steam donkeys at set times; and that "sanding" of engines, to clear out the soot deposited in the boiler tubes by the burning of oil, be restricted to points along the railroads where the burning balls of soot and the particles of hot glass sometimes thrown off by engines during the sanding process will not start fires. Above all, this freedom from fires caused by logging equipment means that a real will to prevent them has been created among the loggers.

Elk Kill on the Absaroka National Forest, 1927

Hunters on the Absaroka National Forest, Mont., last year killed more than 1,500 elk. These elk had made themselves fair game by crossing over from the Yellowstone National Park, their sanctuary, into the national forest during the elk-hunting season, October 15-December 20. The number of cows killed indicates that the majority of the hunters were out for a good piece of meat rather than for sport for its own sake. But as the kill represents about 400,000 pounds of meat and the elk were unusually fat, it may be regarded as so much good meat saved; for even with the reduction in numbers brought about by the hunting, some losses by starvation are expected because of range overstock-

ing. Most of the carcasses were taken out by automobile, many of them lashed to the running boards or front bumpers of passenger cars. About 800 elk were killed within a mile of the automobile roads, many hunters preferring to await their chance of a shot there rather than go 2 or 3 miles into the hills. No large slaughters occurred, because most of the elk crossed the "battle line" from Yellowstone Park at night and reached the hills north of Gardiner before shooting time in the morning, which was at 8 o'clock. A checking station was maintained cooperatively at Gardiner by the park service, the State game department, and the Forest Service. Patrols and hunting camps also kept a check. The total kill is reported as 1,506, of which 419 were mature bulls and spikes, 935 mature cows, and 152 calves.

General Forest News

Some Effects of Fire and Insect Attack on Shortleaf Pine

By F. C. CRAIGHEAD and R. A. ST. GEORGE, United States Bureau of Entomology

On a part of the Pisgah National Forest, N. C., that was burned over April 2, 1925, Federal entomologists and foresters have watched three years' progress of the injury suffered by shortleaf pines as a result of the fire and of subsequent insect attacks. A few days after the fire a quarter-acre plot was established on the Bent Creek Experimental Forest of the Appalachian Forest Experiment Station, in a fully-stocked second-growth stand about 25 years old. The 514 shortleaf pines on the plot were tagged, and for each of these trees a record was made of the degree of fire injury and of certain tree characteristics. At the same time a small square of bark at breast height was removed from many of the trees to serve as a point of orientation and to facilitate checking of subsequent growth.

At the end of the third growing season after the fire 133 of the 514 trees were dead. This number represents about 18 per cent of the cubic volume of the stand.

Insects that have appeared in great abundance on the area are the southern pine beetle (*Dendroctonus frontalis*), which concentrated on the area apparently as a result of the fire; several species of engraver beetles (*Ips*); the pine sawyer (*Monochamus*); and several species of ambrosia beetles. The engraver beetles apparently had no influence on tree mortality. The wood borers and the ambrosia beetles served only as indications of the death of trees. Only one

insect, the southern pine beetle, had an important part in the killing of trees. The death of 16 trees, dominants and codominants mostly in the larger diameter classes, was attributed to the work of this insect rather than to direct action of the fire.

Defoliation, attributable to the intense heat arising from the burning litter, was the type of injury most common among the 133 trees that died. On 99 of these trees, from 81 to 100 per cent of the foliage had been destroyed; on 26, from 61 to 80 per cent; on 7, from 41 to 60 per cent; and on 1 only, as little as 40 per cent. Of all the trees on the plot that were totally defoliated, 43 per cent have died. Thus it may be predicted that the mortality of defoliated trees will amount to 50 per cent.

Trees 2 or 3 inches in diameter, which in the absence of fire would gradually have been thinned out through competition, amounted to 78 per cent of those that died. Trees classed as suppressed made up 49 per cent of those that died and intermediates 25 per cent. Mortality of trees with diameters of 5 inches or more, or of trees classed as dominants, was in practically all cases attributed to the work of the southern pine beetle and not directly to injury by fire.

Measurement of the height to which the trees' stems were scorched brought out the fact that the greater number of deaths occurred among the trees least affected in this way. Of the 133 trees that died 40 per cent were charred to heights of 5 feet or less, and 25 per cent to heights of from 5 to 10 feet. The flames had reached from 10 to 15 feet up the stems of 18 per cent, and from 15 to 20 feet on the remaining 8 per cent. This evidence, coupled with that in regard to the fatal results of defoliation, clearly indicates that injury to trees by

typical ground fires is a matter not of stem char but of the scorching of the foliage by heat that ascends through the crowns.

Other serious results of defoliation were manifested in marked retardation of growth and in reduction of the ratio of summer wood to spring wood. Measurements of more than 20 per cent of the dominant and codominant trees on the plot showed that the basal area increased 11.6 per cent in the three years preceding the fire but only 3.2 per cent in the three years following it. In the upper crown classes, also, 31 of the trees have failed for from one to three years to form an annual ring on the lower part of the stem. Since the fire no ring at all has been formed by 12 of the trees, only one ring has been formed by 10, and only two rings have been formed by 9. All rings formed since the fire show a much greater preponderance of spring wood over summer wood than rings formed before the fire. This change materially affects the density of the wood being laid on in the period of recovery from defoliation, which may extend to 10 years.

Another effect of defoliation, apparently correlated with the restriction in growth of summer wood, is a reduction in the number of resin ducts formed. Examination of increment cores showed that in the three years following the fire the trees have produced less than one-fourth as many resin ducts as in the preceding three years. A very large number of trees have formed no resin ducts whatever since the fire. If this failure to form resin ducts after fires which injure the crown occurs in longleaf and slash pines in the turpentine regions of the Coastal Plain as commonly as it occurs in shortleaf pine on the mountains, it undoubtedly has a very marked effect on their resin production for a number of years following fires. This applies particularly to second-growth stands in which fairly wide annual rings are being laid down and in which the usual chipping operations are not deep enough to cut into annual rings formed before the fires.

Porcupine Control Work on Two National Forests

Porcupine control work of the Bureau of Biological Survey on the Coconino and Tusayan National Forests, Ariz., in 1927 included the baiting of 1,374 dens situated within the summer range of the animals and the placing of poisoned bait at enough tree stations to bring the total of these stations to 677. The tree stations were located over a space of about eight miles, in lines at right angles to the line of porcupine migration.

For use in trees the bait, consisting of strychnine mixed with common salt, is placed in an improvised wooden cup made by boring a hole about $1\frac{1}{2}$ inches in diameter and about 2 inches deep in a block of wood, usually a short piece of a 2 by 4. The cup is nailed to the trunk of the tree usually 8 or 10 feet from the ground,

preferably about 8 inches above a large limb so that "porky" can sit on the limb while he eats.

A check on 72 stations baited during the fall of 1926 and the spring of 1927 showed the remains of porcupines at 32 of the stations and revealed plain evidence of porcupine visitation at 28 of the remaining 40. The latter fact suggests a casualty list much above 32, since past experimentation has shown that predatory animals find and consume large numbers of dead porcupines, leaving no trace of the carcasses except possibly bunches of quills which may easily escape notice in tall grass.

The baiting of tree stations as a method of controlling porcupine infestation was suggested by the discovery that the seasonal migration of porcupines follows fairly well-defined routes and that individual trees within these routes are visited very frequently by the animals. At present it appears to be a far more effective method than the baiting of dens.

Fire Stills for Naval Stores Converted to Steam Stills

Turpentine and rosin stills of the old type, operated by fire, can be adapted to the use of steam through a method devised by J. O. Reed, associate engineer of the naval stores unit, Bureau of Chemistry and Soils. Studies by this organization indicate that the steam still will produce a uniformly higher grade of rosin than the fire still, and larger yields of turpentine; and that it will do the work with less fuel and more speed, and consequently at lower cost. Another very decided advantage is the greater safety of operation of the steam still, which is said to be almost foolproof.

The new improvement was tried out in the spring of 1927 on the operation of the Newton Naval Stores Co., Mississippi. Since then the bureau has taken out a patent on it, dedicating it to the public.

Steam stills have for many years been used with success by the naval stores operators of France, but difficulty has been experienced in finding a type of steam still adaptable to American methods of handling pine gum. In order to operate successfully the types of steam stills that were previously tried out in this country, it is necessary to heat and clean the crude gum before introducing it into the still. The use of the new device permits the gum and the finished products to be handled in exactly the same manner as in the still operated by fire, and necessitates no change in equipment other than the still itself.

The operation of the steam still does not differ very widely from that of the fire still. The heat to bring about distillation is obtained from a system of closed coils placed inside the still in such a way that all gum is uniformly cooked. The coils are so arranged as not to interfere with skimming or discharging the rosin. Live steam, brought in at the bottom of the still

through a sparger, takes the place of the water usually fed into the still to carry over the turpentine. Steam pressure is maintained at 125 pounds during the run. Steam going into the still must be perfectly dry.

Blue prints and specifications for converting fire stills to steam stills are available to naval stores producers on application to the Naval Stores Unit, Bureau of Chemistry and Soils, Washington, D. C.

Mixed Stands the Best Protection Against White Pine Weevil

By H. J. MACALONEY, United States Bureau of Entomology

An extended series of experiments conducted by the Harvard Forest and the Bureau of Entomology in the Northeast has convinced entomologists and foresters that the best and cheapest way to protect the northern white pine from the weevil is to grow it in mixture with other species. The choice of the other species depends on conditions that vary with locality. Preferably, species of value in the final crop will be chosen, such as hemlock and the better hardwoods. In central New England a mixture of white pine with hardwoods offers excellent protection from the weevil; but in regions where the gypsy moth is abundant it is best to avoid the use of hardwoods that may be subject to excessive defoliation by this insect. Ash, sugar maple, and yellow birch are some of the better hardwoods that are not favorable food for the gypsy moth. In order that the white pine may not be crowded out it is necessary to weed the stand in the early stages, if the mixture is with hardwoods, and to thin it as it becomes older.

In pure stands, whether natural or artificial, the greater the number of trees per acre the less will be the weeviling. Where weevil damage is a problem, it is impossible to produce a dense pure white pine stand economically except through natural reproduction and unless the stand is sufficiently dense to offset any weeviling that may occur. Where site conditions and the degree of stocking are favorable for vigorous growth, good stands of pure old field pine occur commonly.

Direct measures for controlling the white pine weevil, are generally too expensive for common practice. In young stands that are isolated, that are only slightly infested, or that are specially valued for aesthetic reasons, it is practical to remove the infested leaders or to use sprays and repellants to prevent weevil attack. Lime sulphur has been tried out with success as an anti-weevil spray.

Of 25 species of parasites bred from weeviled leaders 5 offer some promise in reducing weevil infestation. However, there are many difficulties in the way of breeding and liberating numbers of parasites sufficient to cause a material reduction of the numbers of weevil even over a limited area, and the cost would be excessive. Still, it may be worth while when weeviled leaders

are removed to place them in barrels screened with No. 12 or No. 14 mesh wire to allow the escape of the parasites.

Birds are evidently more valuable than parasites in controlling the weevil. On a northern white pine plantation of more than 3 acres at Petersham, Mass., 30 per cent of the weeviled leaders were stripped by birds and all the larvae destroyed. The birds actually observed feeding were the nuthatch, downy woodpecker, chickadee, and certain warblers. Protection of insectivorous birds is, therefore, important as a control measure. Wood mice and moles, also, undoubtedly serve to reduce the numbers of the weevil.

A New Forest Instrument

By LESTER REINEKE, United States Forest Service

The use of artillery seems to be responsible for the latest development in instruments for use in the forest. Long-range guns required the perfection of a range finder, and the newest forestry instrument is an adaptation of this military device. Though much smaller, in principle it is the same.

This instrument, the Fardi range finder, made by Leitz, is designed for measuring distances up to 50 and 100 yards, respectively, for the 20-centimeter and 40-centimeter sizes. It is accurate within 2 per cent at the maximum distances, and still more accurate at shorter distances. The range finder is a black tube, square in cross-section, equipped with a three-power magnifying eyepiece on one end, a fixed prism at the other, and a movable prism midway to which is attached a disk with a scale of distance. On looking through the eyepiece two images are seen, one yellow and the other white. By moving the circular disk the two images are brought into coincidence, and the distance can be read from the scale. The position of the instrument depends upon the object sighted on—if the object has horizontal lines the range finder is held vertically, if the object has vertical lines the instrument is held horizontally.

The measurement of distances is a common job in forestry. In mapping, cruising, measuring tree heights, etc., the range finder can often be used to advantage, particularly in fairly open country. It works less satisfactorily in very brushy places, or in dense young growth. On steep slopes it is of especial value in measuring tree heights, since the horizontal distance to the tree can be measured and no correction need be made for slope. In circular plots the distance from boundary to center can be easily checked.

In general, the range finder can replace the tape in many types of work in which very accurate measurements of distances are not necessary. It can not be used under all conditions, but for many types of work it will effect a considerable saving in time with no sacrifice of accuracy.

San Francisco Meeting of Society of American Foresters Joint Meeting of American and Missouri Forestry Associations

The 1927 meeting of the Society of American Foresters, held in San Francisco December 16-17, attracted a larger attendance than any of the 26 annual meetings previously held by the society. The registered attendance was 254, of which number 159 were members of the society. Every important group in forestry was represented—Federal, private, educational, State, and county.

The outstanding feature of the discussions, introduced by President Wilbur of Leland Stanford University in the opening address, was a sizing up of the position of the Pacific coast timber resources with regard to the timber needs of the United States and of other countries bordering the Pacific. The problems of industrial forestry came in for a great deal of discussion.

An important feature of the meeting, which was the first the society has held on the Pacific coast, was a two-day field trip which included visits to the redwood forests of Humboldt County, Calif., and the logging, sawmill, and reforestation operations of the Pacific Lumber Co., at Scotia, Calif.

The meeting indorsed the program for fellowships for the encouragement of training in forest research that has been prepared by a special committee of the society at the request of the committee on forest research of the National Academy of Sciences. Approval was voted of the plan for a further study of forestry education outlined by Henry S. Graves at the conference of forest schools held in Berkeley December 15, and the president of the society was requested to take steps to secure financial support for such study and to organize a committee for the investigation if it can be financed. The meeting urged the necessity for a study of the problems of research in forest economics comparable with that recently undertaken in the biological phases of forestry by the National Academy of Sciences. It recommended that the survey of private forestry begun by a committee of the society be continued so that a reasonably complete report may be made to the next meeting of the society; and that the society establish a committee on industrial forestry whose purpose would be to study the problems that seem now to be retarding the development of industrial forestry, with their relation to public welfare, and to cooperate with other agencies toward the solution of these problems.



Forest fire prevention posters lithographed in three colors are displayed in eastern Texas stations of the Southern Pacific, Santa Fe, and Missouri Pacific Railroads. The posters are in two designs, and each bears the name of the railroad using it. They were prepared by the railroads at the suggestion of R. W. Wier, president of the Texas Forestry Association.

Those attending the joint annual meeting of the American Forestry Association and the Missouri Forestry Association, held in St. Louis February 17-18, brought themselves within close range of many active minds, representing many different interests and many sections of the country. Most of the ideas shot at them had to do with industrial forestry, flood control, and public education in forestry.

A paper contributed by William B. Greeley, chief of the Federal Forest Service, restated his theory that forestry has an important but supplementary part in flood control. Wilson Compton, speaking for the National Lumber Manufacturers' Association, asserted that the public owes it to timberland owners to adjust taxation on forest property and to protect such property from fire. Samuel T. Dana, of the University of Michigan, emphasized the importance of public forests and urged the obligation of the lumber industry to support public forestry. Dr. W. W. Long, of Clemson College, South Carolina, discussed "The rôle of forests in the Greater South" from the point of view of the labor situation. In his eyes forestry has great possibilities as a stabilizer of agriculture in the South, where at present a very large proportion of the farmers are tenants. Hon. Charles Nagel spoke for the United States Chamber of Commerce on the subject "Forestry as a factor in agricultural prosperity," and Aldo Leopold represented the Izaak Walton League in voicing the sportsman's interest in flood control. Other speakers were Hon. John M. Parker, former Governor of Louisiana, and Hon. W. I. Nolan, lieutenant governor of Minnesota.

"Stories from real life" about industrial forestry projects were told by E. J. White, vice president, Missouri Pacific Railroad; E. E. Pershall, vice president, T. J. Moss Tie Co., Missouri; Devere Dierks, Dierks Lumber Co., Arkansas; H. M. Wilson, vice president, Baldwin, Lewis, Pace Co., Florida; and John Rue, Champion Fiber Co., North Carolina. Mr. White spoke of the tremendous importance of forests to the railroads as a source of revenue. Mr. Pershall told of his company's success in growing railroad ties at a good profit. Mr. Dierks spoke optimistically of timber-growing prospects in Arkansas, saying that taxation is now the only bar to success. Mr. Wilson told of his company's achievement in keeping down fires. For several years the annual burning on this company's lands has covered considerably less than 1 per cent of their area. Mr. Rue outlined the South's opportunity in the manufacture of kraft paper.

In the final session, methods of educating the public in forest fire prevention and timber growing were discussed by the State foresters of Texas and Alabama, the extension forester of North Carolina, representa-

tives of three industrial concerns, and S. F. Horn, editor of the Southern Lumberman. James M. Wait, of the Federal Forest Service, gave the illustrated talk with which he tours rural communities on the national forests of Arkansas.

Resolutions were adopted by the American Forestry Association appealing to private owners of forest land to expand their work of reforestation and sound timberland management; to the lumber and naval stores industries, to make further efforts for the elimination of waste through preservative treatment of wood and through standardization of products; to the United States Chamber of Commerce, to give earnest consideration to the special tax problems involved in the proper use of forest lands; and to the Federal Government, to expand its program for forest planting both on the national forests and in cooperation with the States.

The Hoo Hoo Club, which has its national headquarters in St. Louis, took an enthusiastic and hospitable part in the meeting. The president of the local chapter, M. E. Meacham, acted as chairman of the session on forests and industry.

Tree Growth in a Massachusetts Plantation

White pine, Scotch pine, and European larch trees in a 2-acre plantation in the town of Lee, Berkshire County, Mass., are reported by the State department of conservation to have reached an average height of 60 feet in 40 years' growth. The trees were planted 6 by 8 feet apart. Their present number, diameter, and volume are as follows:

	Number of trees	Average diameter at breast height	Volume in board feet
		Inches	
White pine.....	271	10	25,000
Scotch pine.....	47	11	5,500
Larch.....	321	9	25,000
Total.....	639		55,500

Arkansas Farmer Plants Black Locust

On waste hillside land on his farm at Pyatt, Marion County, Ark., Ernest Young last year planted 2,000 black locust trees, 6 feet apart each way. The space between the trees was planted to clover. After two years, when the trees will have grown well above the clover, the land can be pastured. Since both the black locust and the clover are nitrogen-fixing plants, while raising the double crop of fence posts and forage the land will be greatly enriched. Mr. Young intends to plant from two to four acres to black locust each year until every acre of his waste land has been reforested.

Handy Timber Scale Sticks

A new set of timber scale sticks for measuring logs and for estimating the contents of standing trees has recently been made available to the public by the American Forestry Association. The Federal Forest Service furnished the directions for use and the descriptive text which accompany the set of sticks.

These timber sticks are intended for the use of farmers, particularly in the Middle Atlantic and Southern States. They show the contents of logs and of standing trees of shortleaf and loblolly pines, as scaled both by the commonly used Doyle rule and the more accurate International log rule. With their use it is a simple matter, also, to estimate the contents of standing trees of any species. The tree scale stick shows the diameter of the tree, and also its height in feet or the number of 16-foot log lengths. By making an estimate of the top diameters of the successive logs in a tree and by using the log scale, one can quickly scale up the contents of the tree in board feet. This is the only safe method of estimating hardwoods, such as the oaks, poplars, gums, and maples.

The values shown on the tree scale stick for shortleaf and loblolly pines practically hold good also for the longleaf and the slash pines, respectively, since in taper, or form, there is a close resemblance between the shortleaf and longleaf and between the loblolly and slash pines. All these values are shown by the Doyle log rule and by the International rule.

Publicity given to these timber sticks by the Associated Press has stimulated requests for a similar set of sticks distributed by the Federal Land Bank of Springfield, Mass. The latter show by the International rule the scale of logs and the scale of standing trees of several kinds of northern conifers and of hardwoods, as well as the scale of trees in fractions of a cord.

The Doyle and International timber scale sticks for the southern region, with a pamphlet of instructions, are inclosed in a substantial cloth case and are being distributed postpaid at cost, \$1, by the American Forestry Association, Lenox Building, Washington, D. C.

Loblolly Plantation in New Jersey Makes Good Growth

A plantation of loblolly pine established 20 years ago on the sandy soil of the Bass River Forest in southern New Jersey will now cut more than 5,000 board feet of box boards per acre, Extension Forester Scovell reports, even though the trees are not now closely spaced. Some of the trees are 40 feet high and 11 inches through the stem at breast height. These individuals have made an average growth of 2 feet in height and more than half an inch in diameter for each of the 20 years. Native hardwood stands of the region, growing on the same type of soil, seldom make half that growth.

Legislation Pending in the Seventieth Congress

Forestry is receiving a good deal of favorable attention in the present Congress. Hearings on the McNary-Woodruff bill and on the McSweeney-McNary bill took a turn decidedly gratifying to advocates of the expansion of Federal purchase and research programs.

The Woodruff-McNary bill, which would establish a fiscal policy for the purchase of forest land for a 10-year period and would authorize total appropriations of \$40,000,000, was passed by the Senate on February 6 with an amendment through which the total appropriations could be made in 8 years instead of 10 and a further amendment that except for purposes of flood control and protection of navigation the acreage to be acquired in any single State should not exceed 1,000,000.

At the conclusion of Senate and House hearings on the McSweeney-McNary bill to establish a definite Federal policy in forest research, the group present visited the White House to tell the President of the purpose of the bill and its urgency, and appeared before the Director of the Budget, who held a short hearing. With the approval of the Department of Agriculture, the bill has been given Budget approval.

Additional bills having to do with forest research that are pending in one or both houses would authorize investigation of waste in the manufacture of pulp and paper, research in hardwoods, the establishment of experiment stations in the northern Rocky Mountains, Georgia, and Arizona, and the establishment of nurseries in Nebraska and California.

The bill extending the Utah National Park and redesignating it as the Bryce Canyon National Park has passed both Houses.

On February 20, the House passed bills making additions to the Idaho, Challis, and Sawtooth National Forests, all in Idaho. Other pending bills which have not yet passed either House contemplate additions to 11 national forests. Four of these would also extend the general exchange act to outside lands in private ownership.

A bill introduced February 4 would authorize the President, upon joint recommendation of the Secretaries of Agriculture and the Interior, to withdraw from entry under the public land laws areas of national forest land chiefly valuable for recreational uses.

Other pending bills would authorize the purchase of lands within the Absaroka and Gallatin Forests for winter range for the Yellowstone elk herd, and the acquisition of lands within the Lassen Volcanic National Park. A bill to grant to the State of California certain national forest lands lying between the two units of the Calaveras Big Tree Grove, in the event that the grove becomes State property, passed the House on February 20.

Bills to authorize the withdrawal from entry of the lands comprising the watershed of the Taos Indian Pueblo within the Carson National Forest have been introduced in both Houses, and the House bill was passed on February 20.

Bills have been introduced in both Houses to authorize the withdrawal from entry of lands which form parts of municipal watersheds, to authorize regulations governing the use of such lands, and to provide for cooperative watershed-protection agreements with municipalities for periods not exceeding 25 years.

Two bills relating to the control of grazing within national forests are pending in the Senate. Three bills relating to the control of grazing upon the unreserved public domain also are pending, one in the Senate and two in the House.

Other bills now pending in one or both Houses would amend the protective and cooperative features of the Clarke-McNary Act; cede the unreserved public domain to the several States; allow the State of Washington to select certain national forest land to offset deficiencies in the land-exchange program; increase the percentage of national forest receipts paid to the States; grant additional powers of arrest to forest officers, and penalize assault on forest officers in the discharge of their duties; and authorize the President to establish game sanctuaries within national forests by proclamation.

Forest Protection Board Expanded

The Federal Forest Protection Board, organized a year ago by the chief coordinator, has enlarged its membership. In addition to representatives of the four bureaus administering forest land and of the Weather Bureau, it now includes representatives of the bureaus dealing with forest problems relating to insects, rodents, and tree diseases—the Bureaus of Entomology, the Biological Survey, and Plant Industry.

At a January meeting the board decided that local committees should be organized to act for it so far as possible in handling local problems of interbureau cooperation in forest protection. Accordingly, such committees have been appointed from the field organizations of the eight bureaus, one committee in each of six divisions of the West. These committees are expected to consider local opportunities for the bureaus to act together in purchasing materials and supplies for forest protection and in training men for forest fire protection work; studying forest problems relating to insects, rodents, and tree diseases and carrying out operations for the control of forest pests and tree diseases; analyzing fire records and providing each other with consultants in fire analysis; and making studies looking toward better correlation of amounts appropriated to different bureaus for forest-protection work.

Seedlings from Historic Gethsemane Cypress Trees

While visiting in the Holy Land in the summer of 1924 Ansel Hall, of the National Park Service, noticed that some of the cypress trees in the Garden of Gethsemane had a good crop of cones. Finding the seed to be of good quality he collected a pocketful of cones and carefully brought them back with him to California. The seed were sown by Woodbridge Metcalf at the forest nursery of the University of California in Berkeley. With careful attention about 300 germinated and grew into sturdy seedlings, which at the end of the growing season averaged 2 to 3 inches in height. Half the seedlings were placed in a transplant row on the Berkeley campus and the others were sent to the State forest nursery at Davis, where they were planted in pots. By the winter of 1926-27 the trees at Davis were 8 to 12 inches high. The trees are now growing in churchyards and public grounds in many parts of California and elsewhere and reports are being received of

their satisfactory growth in many situations. One planted on the grounds of the Congregational Church of Paso Robles at Christmas, 1926, made a growth of more than 20 inches in height during the following year and is now 40 inches tall.

A few of these rare trees are still available for planting in places where their significance will be appreciated. Particulars can be obtained from the State forester, Sacramento, Calif.



On lands in the State of Washington west of the Cascades and not included in national forests, 88.7 per cent of all the timber killed during the fire season of 1927 was killed in the period when the relative humidity went below 30 per cent, the Washington Forest Fire Association reports. This same period saw the destruction of 74 per cent of the logs destroyed during the season. The danger period was from July 16 until August 25, with a break on August 19.

Foreign Notes

Roots of Alders Protect Stream Banks

Roots of alders on stream banks make a good protective curtain against the erosive power of freshets, according to observations made on a stream in Switzerland by W. Nageli and reported in the *Journal Forestier Suisse* for December. This stream, which flows into Lake Geneva and is called Baie de Montreux, overflowed its banks as a result of a sudden downpour on August 2, 1927, and caused great damage along its lower course. After the flood, examination revealed that in places where the channel of the Baie de Montreux was wide and where alders were growing the banks were vertical and were clothed in a closely matted network of alder roots which protected them against further erosion. These roots were as much as 3 meters long and, pressed against the bank by the flow of the water, acted as a protecting curtain. In places where the banks were not wooded or where conifers were growing the erosion was much greater. In those parts of the stream where the abrasive action of solid matter in the water was fully effective, as in narrow places or at curves, the protection given by the roots of the alders was much less evident. Even there, however, although the flood had scoured all the bark off the trunks of some of the trees, no trees had been uprooted.

A Biological Soil Problem

By E. N. MUNNS, United States Forest Service

The failure of alfalfa in many localities years ago was found to be due to a lack of nitrogen-forming bacteria in the soil. When these bacteria were supplied, alfalfa flourished where before it had failed. Somewhat similar failure in trees has been noted by a number of foresters who attributed the poor growth of trees in certain seed beds—or even in patches within a seed bed—to all manner of troubles such as damping-off, sun scald, poor soil, or drought. It has remained for S. L. Kessell, conservator of forests in western Australia, to put forth a reason for such patchiness that seems just as plausible as that for the poor catches of alfalfa.

In the Australian planting work, which has been extended rapidly in the past six years so that now 14 large nurseries are in operation, trouble early developed with Monterey pine (*Pinus insignis*) and Stone pine (*Pinus pinaster*), the two pines used most extensively. After successful germination the Monterey pine would turn a sickly yellowish green and its needles would become dwarfed. The Stone pine turned reddish and its needles, likewise, assumed a stunted form. Investigation disclosed that neither shade, water, soil acidity,

soil chemicals, nor disease was responsible. Elimination of the variables one by one forced the conclusion that some soil organism necessary to the normal development of trees of these species was not generally present in the local soils. Soil from nurseries where the young trees grew thriftily was transported to the new nurseries and sprinkled generously over the surface. Marked results appeared almost instantaneously. Trees developed a healthy color and took a new lease on life, and the new needles were of the proper length for the species. When the soil was applied to seed beds in advance of sowing, the seedlings developed normally and thriftily from the start. Whether or not this result is due to a mycorrhiza is unknown as yet, but the fungus was not found in the original soil and is found in the new. Some biological factor, whether fungus or bacteria, would seem to be involved.

Not only do the two pines mentioned respond to the treatment, but so do some other American species—the slash, shortleaf, longleaf, and Bishop. Perhaps some of our own nursery soils would respond to similar treatment.

Dying Oaks in Europe

By R. E. BALCH, United States Bureau of Entomology

Since writing in the *Forest Worker* of November, 1927, about the dying oaks in this country I have read of an apparently similar condition in Europe which suggests that this mortality is widespread and perhaps of periodic occurrence.

In the *Quarterly Journal of Forestry*, January, 1927, R. L. Robinson draws a comparison between the death of large numbers of oaks in Slavonia, Jugoslavia, and a similar trouble in the south of England. In both cases defoliation by caterpillars (*Tortrix viridana* in England and *Liparis dispar* in Slavonia), followed by an oak mildew on the leaves (*Microsphaera alni*, var. *quercina*), preceded the death of the trees. The trees were nearly all making fair growth at the time of death. *Armillaria mellea* was present on the roots of all those examined. The trees died suddenly during the summer, singly or in groups, much as they have been doing at intervals for a number of years in the Lake States, Middle Atlantic States, and Southern Appalachian region. Pedunculate oak was by far the most susceptible species.

L. H. Osmaston in the same number of the journal comments on the condition in England and notes that oaks of all ages from 20 to 150 years have been involved. He mentions as contributory causes defoliation, mildew, *Armillaria*, drought, and "possibly, bad silvicultural conditions."

Doctor Yossifovitch in the *Revue des Eaux et Forêts*, June, 1927, says that in Slavonia 125,000 acres of oak forests have been decimated in 15 years. He mentions the same factors as "predisposing causes" and thinks that probably *Armillaria* delivers the death blow. In

the January number of the same journal, J. Demorlaine draws attention to recent great losses of oak in the pure stands of the Forêt de Compiègne as well as in other parts of France.

Although the species of oak and, with the exception of *Armillaria*, the fungi and insects involved are different, the deaths in Europe seem to occur in essentially the same manner as those in America. In the European as in the American instances there is a combination of adverse circumstances, none of which, however, appears to explain very satisfactorily the sudden mortality. It may be that certain oaks, when their development is checked by some such conditions as drought or defoliation, rapidly succumb to any one or more of these enemies; or possibly some factor as yet unrecognized is at work.

Protection Forests Established on Privately Owned Lands in France

In accordance with the provisions of a law enacted April 28, 1923, and known as the Chauveau Law, 28,882 hectares of forest on privately owned land in France has been classified as "protection forest" and put under regulation to protect it from avalanches, erosion, and the encroachments of water and sand. In addition 24,505 hectares have been listed for classification, making a total of 53,387 hectares. About two-thirds of the total (34,156 hectares) is in the region of the Pyrenees.

The law requires the forestry authorities, while making sure that the wooded condition of the land is preserved, to exercise care not to impose on proprietors any measure that will diminish the revenue from the forests and has a provision for indemnities in case of loss to the proprietors. The business has been handled in such a way that so far no proprietor has made application for such indemnity.

Japanese Law Protects Natural Monuments

Japan has a law, passed in 1919, that authorizes the department of home affairs to designate "natural monuments" for preservation. The law applies to privately owned monuments as well as to those publicly owned, but provides for indemnity to any proprietor who is injured by the restraint on the use of his property.

Under this law types of monuments in the vegetable kingdom listed as suitable for designation by the minister of home affairs include trees remarkable for their size or age, typical virgin forests, types of alpine vegetation, rare plants, interesting landscapes containing remarkable plants, plants that are becoming rare, waterfalls harboring characteristic plants, peat bogs and their most typical plants, and dunes that have been stabilized by vegetation.

In the first seven counties covered by a Government survey of the forest resources of Norway it has been found that the average volume of timber per hectare (2.47 acres) is 45 cubic meters (35.32 cubic feet), with an annual increment of 1.37 cubic meters.

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Increment cores taken in the general forest survey now in progress in Sweden are preserved by inserting each core in a paper tube one end of which is closed by flattening and stapling. The tubes are made of several turns, or layers, of paper and so are stiff enough to endure ordinary handling without becoming bent. A printed form on each tube permits the entry of a record identifying the core.

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The tree-planting division of the Canadian Forest Service in 1927 shipped to the prairie Provinces 7,430,000 broadleaf seedlings and cuttings. More than 11,000 farmers shared in the distribution.

Forest fires in British Columbia burned over a smaller area in 1927 than in any other year since 1913 and caused only one-tenth as much damage as those of 1926, Minister of Lands Pattullo reports. Of the 1,284 fires reported during 1927, 88 per cent were kept within a limit of 10 acres. The total acreage was 102,000. Fire-fighting costs amounted to a little more than \$80,000, the lowest figure for any year since 1923. Campers and travelers caused 27 per cent of the reported fires.

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A superficial root of a gum tree in the forest of Bled Talha, Sahara, measured by Forest Inspector L. Lavauden, was more than 42 meters long. Inspector Lavauden states that the downward development of tree roots in the Sahara is not less than this, and adds: "I have measured roots going straight down into the soil that were as thick as my fist 8 meters below the surface."

Personals

William B. Greeley, chief of the United States Forest Service, will resign May 1 to become secretary-manager of the West Coast Lumber Manufacturers Association. Mr. Greeley's connection with the Forest Service has been continuous since 1904, with the exception of two years' military service. Twenty years ago he was called to Washington from the field to become assistant chief of the division of forest management. Later, after serving for a time as district forester of the northern national forest district, he became chief of forest management. During the World War he was given charge of recruiting forestry troops for overseas duty, and then was placed in command of the forestry regiment, the Tenth Engineers, in France. In 1920 he succeeded Henry S. Graves as chief of the Forest Service.

Mr. Greeley is to be succeeded by R. Y. Stuart, his assistant in charge of public relations work. Mr. Stuart likewise entered the Forest Service directly from the Yale Forest School, in 1906. After six years' experience on the western national forests he joined the Washington staff as inspector of national forest timber sales, and later he took charge of the entire western division of this work. In 1917 he was furloughed for military service overseas with the Tenth Engineers. In 1920 he became deputy commissioner of forestry in Pennsylvania, and throughout the administration of

Gifford Pinchot as Governor of Pennsylvania he had full charge of the State's forestry work, as secretary of the department of forests and waters. He assumed his position as chief of the Forest Service branch of public relations in February, 1927.

W. E. Jackson, jr., has been appointed State forester of Kentucky, succeeding Fred B. Merrill whom he formerly assisted.

Harry Lee Baker, assistant forest inspector of the division of State cooperation, United States Forest Service, has been appointed State forester of Florida. For the past two and one-half years Mr. Baker has had charge of investigations, authorized by section 1 of the Clarke-McNary Act, looking toward permanent and adequate fire protection for the different forest regions. In 1926 he made an extended study of forest-fire conditions in Florida. Mr. Baker has had 10 years' forestry experience on the national forests of the West, and has served as district forester in Virginia and assistant State forester in North Carolina. He will assume his duties in Florida soon after April 1, with headquarters at Tallahassee.

H. O. Cook has resigned as extension forester for Massachusetts. R. B. Parmenter, who was Mr. Cook's assistant, has succeeded him.

Lars G. Romell, of the Swedish Forest Experiment Station, Stockholm, has been appointed to the Charles Lathrop Pack research professorship in forest soils at Cornell University, and will take up the duties of that chair about April 1, 1928.

A. B. Brooks, for six years chief game protector with the West Virginia Game and Fish Commission, has resigned. Ernest Angelo, a member of the faculty of the Department of Agriculture, University of West Virginia, has been appointed to succeed him.

R. H. Colley, pathologist in charge of the work in forest pathology carried on by the Bureau of Plant Industry at the Forest Products Laboratory, Madison, Wis., has resigned to accept a position with the Bell Laboratories, New York City. Doctor Colley entered the bureau's office of forest pathology in 1916, and began his work at Madison in 1921. In his new position he will direct research and survey work on the engineering and pathological problems encountered by the Bell Telephone Co. and its associates in connection with their use of poles and other wood products.

R. R. Fenska, who since the beginning of his sabbatical leave from the New York State College of Forestry, September 1, 1927, has been forester for the Massachusetts Forestry Association, resigned that position February 15 to accept one as field representative for the West Coast Lumber Trade Extension Bureau, Longview, Wash. On September 1, 1928, he will again take up his duties as professor of forest engineering at Syracuse University.

E. B. Stone, forest examiner on the White Mountain National Forest, has been appointed assistant State forester of Georgia.

Dr. David Fairchild has requested that he be relieved of charge of the office of foreign plant introduction, Bureau of Plant Industry, and has been succeeded by Knowles A. Ryerson. Doctor Fairchild has had charge of this office almost continuously since its inception in 1897. He will remain with it as senior agricultural explorer and in an advisory and consulting capacity and will conduct special studies of foreign-plant introduction with particular reference to plant breeding and improvement of crop plants. Mr. Ryerson recently acted with a commission making an agricultural survey of Palestine, and since then has served as horticulturist for the Government of Haiti.

Shirley W. Allen, forester for the American Forestry Association, has been appointed to the staff of the School of Forestry and Conservation, University of Michigan, effective April 1. Mr. Allen's activities for the present will consist in efforts to introduce and strengthen forestry and conservation teaching in the public schools of Michigan.

A. H. Howell, of the Bureau of Biological Survey, has been assigned to investigations of animal ecology at the Appalachian Forest Experiment Station. His work this spring will be upon a determination of the relative abundance of rodents on the Bent Creek Experimental Forest.

Hugh P. Baker has left his position as secretary-manager of the American Pulp and Paper Association to take charge of the newly created department of industrial relations of the United States Chamber of Commerce.

Carlos G. Bates has found it necessary to give up work in the biological section of the Forest Products Laboratory, Madison, Wis., because of poor health. Mr. Bates has been assigned to the Lake States Forest Experiment Station, St. Paul, Minn., and Arthur Koehler has taken his place at the laboratory.

Dr. J. von Monroy, who visited America in 1926, is now in charge of the committee of foreign relations and the committee for forest machinery of the Deutsche Forstverein, with offices at Hedemonstrasse 30, Berlin SW. In this capacity he will be glad to see all American foresters visiting Germany, to help them get in touch with German foresters in their own lines of work, and to assist them in arranging their tours.

G. E. Marshall has resigned as supervisor of the Minnesota National Forest, on which he has served continuously since it was established. In 1903 he directed a crew of land examiners and cruisers of the General Land Office in appraising land of the Chippewa Indians that is now included in the national forest. Mr. Marshall will hereafter be associated with the Weyerhaeuser Timber Co. in Minnesota.

James D. Kennedy has been released by the New York State Conservation Commission from his duties as blister rust control agent for the five-month period beginning January 16, and during that time will assist Prof. J. A. Cope as extension forester for New York. This arrangement will enable Professor Cope to give part time to resident teaching work.

Officers elected by the Society of American Foresters for the year 1928 are O. M. Butler, president; C. S. Chapman, vice president; Ward Shepard, secretary; and S. B. Detwiler, treasurer. R. Y. Stuart has been elected a member of the executive council.

A. R. Trist, a research forester of Australia, has been sent by the Australian Government to the United States to study the methods employed in silvical research in America and the organization of the forest experiment stations. Mr. Trist has visited the Northeastern Forest Experiment Station and is now enrolled in the Yale Forest School. He will be in this country for two years.

Bibliography

Timber Growing in South Africa

By E. N. MUNNS, United States Forest Service

The one who picked up "Tree Planting in South Africa," by Dr. T. R. Sim, of Natal, expecting to find a full discussion of planting problems and technique, the book proved a disappointment; for reforestation is mentioned only in passing. The main part of the book is devoted to a description of various species that have been found useful in South Africa or that hold possibilities of usefulness in that country, together with the opinions of authorities (which often differ markedly) as to the value, growth rates, or uses of individual species. But against a background of experience with the same species in southern California, where climatic conditions are similar to those the author considers, the book is interesting. For any one interested in general forestry work in South Africa, the volume is full of meat and has value as a reference. A glimpse at the table of contents tells the story, for there are chapters on the timber famine, timber problems, wood utilization, climate and erosion, pests and troubles of trees, growth, care of the forest, harvesting, trees for lawns, farms, and forests, indigenous trees, and exotics grouped under pines, acacias, eucalypts, cedars, and miscellaneous. And among this array one finds two short chapters on planting!

Since the author has seen 20 years' development of timber growing in South Africa, his observations on the economics of forestry are interesting and unique. He tells the South African farmers that in growing timber they are dealing "with a rotation crop, not with a sentimental heirloom to posterity."

Most of the forest land of South Africa is veld or brushland, though in restricted localities there are some valuable tropical hardwoods. These do not meet the demands for boxwood, construction timbers, etc., and the annual bill for timber imported from the Baltic countries is about \$15,000,000. The Government embarked in 1922 on a policy of planting each year some 10,000 acres, and so far has lived up to it fairly well. Some plantations have failed, others have succeeded.

The Monterey pine has demonstrated its worth as a general utility tree for South Africa, and is being grown upon a 30-year rotation. This tree is generally recommended for most planting operations, and the wood is praised for all kinds of uses. Canary island pine is to be preferred for poorer sites, but its wood is classed as far inferior. Slash pine grows well in wet and swampy places, but is not yet old enough to give

an indication of yields. The cluster pine, also, is recommended as being better than the Monterey for some sites. Among the eucalypts *E. saligna* is given first place, followed by the better known and widely used trio that appear to do so well everywhere, *E. tereticornis*, *E. rostrata*, and *E. globulus*. Of the acacias, *A. melanoxylon*, *A. decurrens*, and *A. mollissima* do best in South Africa, as in California.

Growth in South Africa is astounding. Monterey pine is reported to have grown as much as 8 feet a year, and one patch of eucalypts sustained for 11 years an annual growth of 12 feet in height and 1 inch in diameter. However, poor form and slow growth are as characteristic of these species on poor sites in South Africa as under similar conditions in California. Slash pine apparently does not do so well in Africa as in its native haunts.

The book is illustrated with drawings by the author.

The bibliography contains 169 references. One notes that most of the American titles are of rather ancient vintage. Apparently South Africa and the United States have had little interchange of forestry literature since about 1911. Should not more effort be made to keep foreign foresters posted as to what we are doing? Doctor Sim's quotation of American publications 20 years old in support of his arguments for or against a species also suggests the question, do not we also greatly err in quoting old foreign publications? The answer is no; most of us don't read foreign publications anyway.

Management Plans

An exposition of Forest Service methods of making forest plans has just been published under the title "Management Plans," by Inman F. Eldredge, formerly forest inspector in the Forest Service. The publication was written with special reference to the national forests, but contains much information useful to foresters and timber owners generally, especially those who are engaged in making or carrying out management plans. In an appendix are given the management plans which have been put into effect for the Custer Working Circle, Harney National Forest, South Dakota; Meadow Valley Working Circle, Plumas National Forest, California; Woodland Working Circle, Pike National Forest, Colorado; and Rio Pueblo Working Circle, Carson National Forest, New Mexico.

Copies of this bulletin (Miscellaneous Publication No. 11-M) can be obtained without charge by writing to the United States Forest Service, Washington, D. C.

Range Revegetation in Colorado

By WILLIAM A. DAYTON, United States Forest Service

In "Revegetation of Waste Range Land" Dr. Herbert C. Hanson, of the Colorado Agricultural College, Fort Collins, Colo., reports that favorable results have been obtained in Colorado by artificial sowing of the seed of forage plants. Abandoned plowed areas in the foothills were sown to smooth brome and slender and crested wheatgrasses, and certain alkali seepage lands to slender wheatgrass, yellow sweet clover, meadow fescue, redbtop, and smooth brome. These sowings were preceded by proper soil preparation. He further states that with a suitable wind common sagebrush (especially if tall and dense) may be quickly destroyed by fall burning, and that a good stand of native grasses follows such treatment. Naturally, this practice should be taboo where there is a forest-fire hazard. Doctor Hanson has found that range areas undergoing revegetation should be protected from grazing for at least one year and that when they are grazed the deferred and rotation systems of grazing should be applied to obtain maximum carrying capacity and forage production.

Doctor Hanson's bulletin, Colorado Agricultural Experiment Station Bulletin 332, is illustrated with seven views of Colorado range improved by artificial seeding or other methods.

An English Paper on Bark Beetles

By F. C. CRAIGHEAD, United States Bureau of Entomology

A valuable addition to the literature on bark beetles has been made by Dr. J. M. Munro in his "British Bark-Beetles" (Bulletin No. 8 of the British Forestry Commission). This is a paper of 77 pages illustrated with 32 text figures and 10 excellent plates. The first and second of the four chapters give an excellent general picture of the biology of the bark beetles of the British Isles and the relation of these beetles to the practice of forestry. Most forest entomologists of this country will find themselves in agreement with Munro's opinions on the ineffectiveness of natural enemies, the relation of bark beetles to forestry practices and particularly to slash disposal, and the preference of the beetles for unhealthy or less vigorous trees. Here, however, a note of caution may be sounded; the conclusions he draws as to the secondary nature of the British species and the influence of weather conditions should not be too strictly interpreted as applying to American conditions. In this country, owing to the great damage caused by *Dendroctonus*, the problems upon which the British entomologists are working receive little attention.

Forest pathologists should be interested in Doctor Munro's discussion of the interrelation of bark beetles and fungi, a rich field for further investigations.

Chapters 3 and 4 deal with the structure, classification, description, and habits of the British species giving much fine biological detail. Appendix 1 lists the bark beetles occurring in various host trees and plants. Scotch pine (*P. sylvestris*) is host to by far the largest number of species. Appendix 2 gives a very good bibliography, which is appropriately discussed in the text. Although several references are made in the text to American conditions, the bibliography is markedly lacking in titles of recent American literature.

This is undoubtedly the best general work upon the Scolytidae that has appeared since Swaine's bulletin on Canadian bark beetles. Although its standpoint is that of conditions in the British Isles, the picture it draws is broadly applicable to this country. Chapters 1 and 2 should be read by all American foresters and forest entomologists.

A Study of Federal Aid

In a volume entitled "Federal Aid" just issued, Dr. Austin F. Macdonald of the University of Pennsylvania gives a concise account of the Weeks and Clarke-McNary cooperative work. To foresters, however, the chief interest of the book will be not so much the forestry chapter as the way in which Doctor Macdonald brings out the relation of the forestry cooperation to the whole of what he calls "the American subsidy system." Chapters are included on agricultural extension, highways, vocational education and rehabilitation, hygiene of maternity and infancy, and the national guard. Also the history, evolution, and future of the system of Federal aid are discussed. The volume is written in a clear and easy style and without waste of words.

Recent Publications of the Forest Service

Circulars: 19, Forests and Floods; 21, America and the World's Wood Pile.

Map Folders: Natural Bridge, Mount Hood, Washakie, National Forests of Arizona and New Mexico.

Forest Products Research in Pictures: 79, Lumber Moisture Change in Box Car not Important.

American Forest Week Material: Program for Observance of American Forest Week (revised); Forestry Facts (16 pp.); President's Proclamation of American Forest Week, April 22-28, 1928 (1 p.); How You Can Help Protect the Forests (card about 5½ by 10 inches, with pictures and text).